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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,208	11/26/2003	Viraj A. Patwardhan	NSC1P131X3	1207
22434	7590	09/19/2005	EXAMINER	
BEYER WEAVER & THOMAS LLP			TRINH, HOA B	
P.O. BOX 70250			ART UNIT	
OAKLAND, CA 94612-0250			PAPER NUMBER	
			2814	

DATE MAILED: 09/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No. 10/707,208	Applicant(s) PATWARDHAN ET AL.	
	Examiner Vikki H. Trinh	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2005.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-16 and 21-31 is/are pending in the application.
- 4a) Of the above claim(s) 14-16, 22-24 and 28-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-13, 21 and 25-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 February 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>07/11/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Acknowledgement

Amendment filed on July 07, 2005, has been considered. Claims 8-16, 21-31 are pending in this application.

Election/Restrictions

1. Claims 14-16, 22-24, 28-31 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to nonelected Groups, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on Feb. 01, 2005.
2. This application contains claims 14-16, 22-24, 28-31 drawn to an invention nonelected with traverse in the reply on 02/01/05. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Specification

3. The amendment filed 07/07/05 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: In claim 1, the resulting mid-level wetting angles remain sufficiently high such that the mid-level junctions do not become the primary location for solder joint failure and the resulting first wetting angles are at least approximately 40 degrees; in new claim 26, the first and mid-level wetting angles are greater than about 50

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degrees; in new claim 27, the first and mid-level wetting angles are equal to or greater than about 60 degrees.

Applicant is required to cancel the new matter in the reply to this Office Action.

Priority

This application does not claim a foreign priority.

Claim Objections

4. Claims 8, 26 and 27 are objected to because of the following informalities: In claim 1, the resulting first wetting angles are at least approximately 40 degrees; in new claim 26, the first and mid-level wetting angles are greater than about 50 degrees ; in claim 27, the first and mid-level wetting angles are equal to or greater than about 60 degrees. Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required

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feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 8 recites the broad recitation of the range for the support coating's height such that the upper surface of the support coating meets the solder bumps, and the claim also recites that the height of the support coating is from about 20-70 percent of the pre-reflow height of the solder bumps which is the narrower statement of the range/limitation. Dependent claims 9-12, 25-27 fall together with claim 8.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 8-13, 21, 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buchwalter et al. (2002/0109228 A1) (hereinafter Buchwalter).

As to claims 8, 13, and 21, Buchwalter discloses a integrated circuit device (fig. 1H) , comprising a die 22 (fig. 1H) having an active surface (fig. 1H), a plurality of solder bumps 18

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(fig. 1H) formed on the active surface of said die such that base junctions between the solder bumps 18 and their associated surfaces of formation define first wetting angles; and a support coating 14 (fig. 1H) formed on said active surface of said die 22 (fig. 1H), wherein said support coating has been fully cured (page 2, col. 2, lines 34) prior to any reflow of any of said plurality of solder bumps 18 (fig. 1H), and the resulting mid-level wetting angles remain sufficiently high such that the mid-level junctions do not become the primary location for solder joint failure.

However, Buchwalter does not explicitly teach that the height of the support coating is about 20-70 percent of the pre-reflow height of the solder bumps 18 , and the resulting first wetting angles are at least approximately 40 degrees . Nevertheless, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Buchwalter with a specific range for the support coating's height and the resulting first wetting angles is about 40 degrees, since it is a prima facie obvious to an artisan for optimization and experimentation to create a specific range for the support coating height and the resulting wetting angle of 40 degrees because applicant has not yet established any criticality for the specific angle.

Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising therefrom. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. (In re Woodruff, 919 F.2d 1575, 1578 (Fed. Cir. 1990).)

As to claim 9, the support coating 14 (fig. 1H) is formed from an epoxy based material (page 2, col. 2, line 46).

As to claims 10-11, 25, Buchwalter does not explicitly state a specific range (40-60 percent or 48-52 percent or 50 percent) for the height of the support coating 14 (fig. 2C) relative

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to the bumps 18 (fig. 2C). Nonetheless, it would have been obvious to one of ordinary skills in the art at the time the invention was made to construct the support coating having a range of height relative to the bumps, since it is a prima facie obvious to an artisan for optimization and experimentation with a specific range for the height of the support coating relative to the bumps because applicant has not established any criticality for the specific range.

As to claim 12, the support coating is applied over the active surface and the underlying pads, under bump metallization (fig. 1H).

As to claims 26-27, Buchwalter does not explicitly state a specific range (greater than 50 degrees or greater than 60 degrees) for the wetting angles. Nonetheless, it would have been obvious to one of ordinary skills in the art at the time the invention was made to construct the invention of Buchwalter with the wetting angles' range, as claimed, since it is a prima facie obvious to an artisan for optimization and experimentation to create the specific wetting angles' range because applicant has not established any criticality for the specific range.

Response to Arguments

10. Applicant's arguments filed 07/07/05 have been fully considered but they are not persuasive.

I. There is no priority claim under 35 USC sec. 120.

II. Withdrawn claims 14-16, 22-24, 28-31 should be canceled because they directed to non-elected Group.

III. Argument for objection of claims 12-13 is moot.

IV. Argument for rejection claims 8-12 and 21. Criticality for the range can not be overcome figures alone or a result statement in the specification. Applicant must show the

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unexpected results entirely. Further, applicant argues that Buchwalter shows in the figures that the polymeric layers 14 cover the bumps. The examiner notes that drawings from the patent reference are not to scale. In addition, applicant admits that Buchwalter teaches layer 14 being thinned to expose the top surface of the bumps (page 8, lines 18-19), thereby being less than the bumps. Therefore, the rejection is maintained.

V. Argument of Claim 13 is moot in view of the new rejection.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Vikki Trinh whose telephone number is (571) 272-1719. The Examiner can normally be reached from Monday-Friday, 9:00 AM - 5:30 PM Eastern Time. If

attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Mr. Wael Fahmy, can be reached at (571) 272-1705. The office fax number is 703-872-9306.

Any request for information regarding to the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Also, status information for published applications may be obtained from either Private PAIR or Public Pair. In addition, status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. If you have questions pertaining to the Private PAIR system, please contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

Lastly, paper copies of cited U.S. patents and U.S. patent application publications will cease to be mailed to applicants with Office actions as of June 2004. Paper copies of foreign patents and non-patent literature will continue to be included with office actions. These cited U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site (www.uspto.gov), from the Office of Public Records and from commercial sources. Applicants are referred to the Electronic Business Center (EBC) at <http://www.uspto.gov/ebc/index.html> or 1-866-217-9197 for information on this policy. Requests to restart a period for response due to a missing U.S. patent or patent application publications will not be granted.

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